Two-Tier Search System: Logical Components Diagram
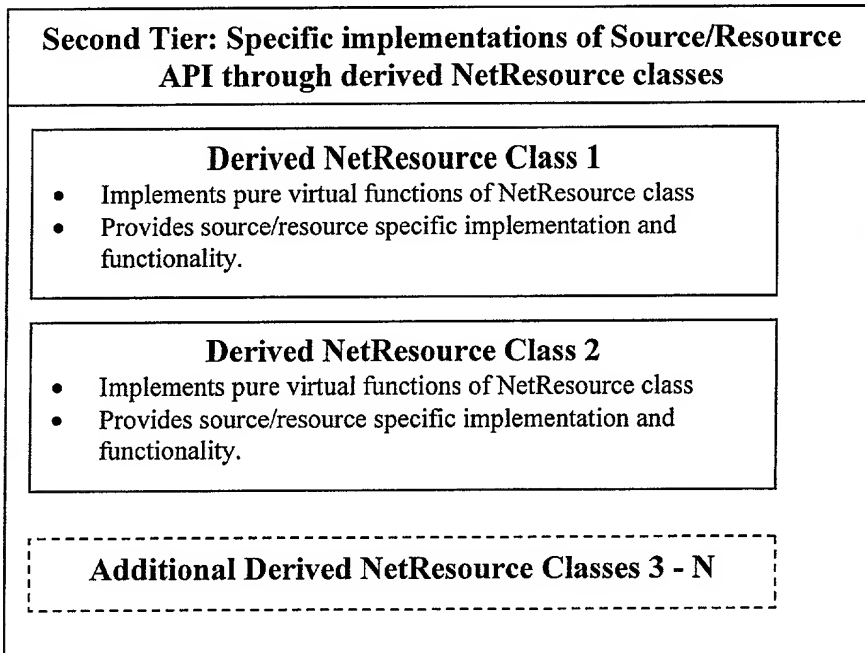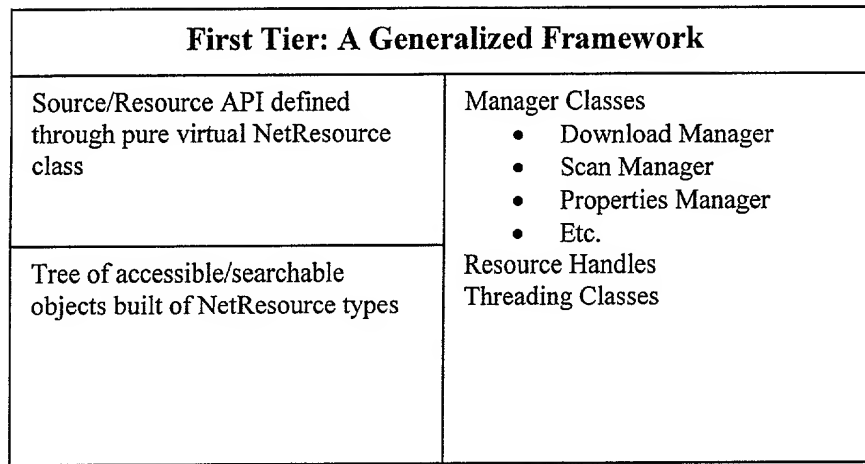
First Tier: A Generalized Framework

Source/Resource API defined through pure virtual NetResource class	Manager Classes • Download Manager • Scan Manager • Properties Manager • Etc.
Tree of accessible/searchable objects built of NetResource types	Resource Handles Threading Classes

Second Tier: Specific implementations of Source/Resource API through derived NetResource classes

Derived NetResource Class 1
- Implements pure virtual functions of NetResource class
- Provides source/resource specific implementation and functionality.

Derived NetResource Class 2
- Implements pure virtual functions of NetResource class
- Provides source/resource specific implementation and functionality.

Additional Derived NetResource Classes 3 - N

Figure 1

NetResource as the embodiment of the Source/Resource API and derived NetResource classes implementing specific functionality

NetResource Base Class (Tier 1)

Scan: Pure Virtual Function

IsAvailable: Pure Virtual Function

Search: Pure Virtual Function

GetChildren: Pure Virtual Function

Open: Pure Virtual Function

Copy: Pure Virtual Function

- Import: Virtual Function
- Export: Virtual Function
- Query for Properties: Pure Virtual Function
- List Additional Functions: Pure Virtual Function
- Perform Additional Functions: Pure Virtual Function

Local Hard Disk NetResource (Tier 2)

- Scan: Index files and folders on local hard disc
- IsAvailable: Determine if hard drive is still accessible to user
- Search: Search through index files matching to predefined search phrase.
- GetChildren: Return NetResource objects representing files and folders in root directory of hard disk
- Open: Opens the hard disk
- Copy: Returns false. Can not copy a whole hard disk
- Import: Returns false, Hard Disk can not be imported
- Export: Returns false, Hard Disk can not be exported
- Query for Properties: Return properties of hard disk (e.g. size of drive, space available)
- List Additional Functions: E.G. Format, defragment
- Perform Additional Functions: Perform defragment

Web Search NetResource (e.g. Yahoo) (Tier 2)

- Scan: Return false, web search can not be indexed.
- IsAvailable: Check website is accessable
- Search: Pass search phrase to web search. Return NetResource objects representing results.
- GetChildren: Return false, web search has no children.
- Open: Open web search in web browser
- Copy: Returns false. Can not copy web search
- Import: Returns false, web search can not be imported
- Export: Returns false, web search can not be exported
- Query for Properties: Return properties of web search (e.g. location, ping speed)
- List Additional Functions: None to list
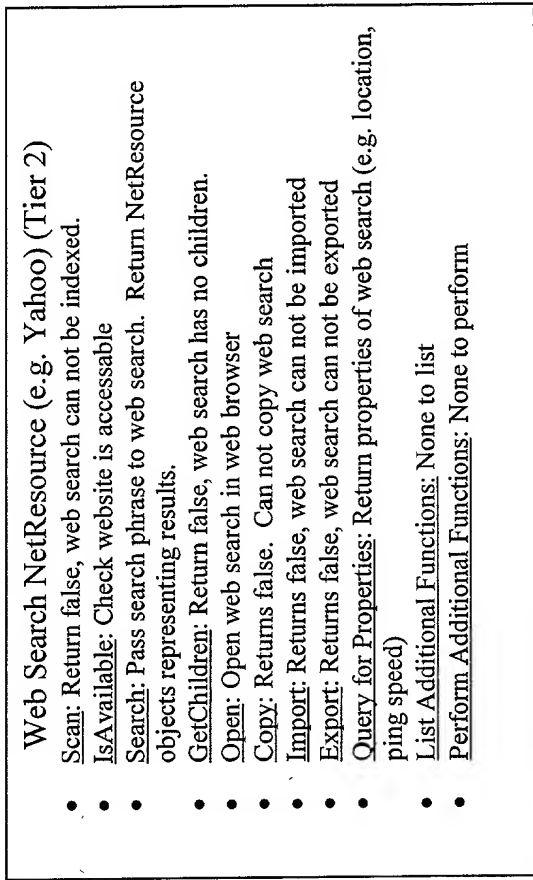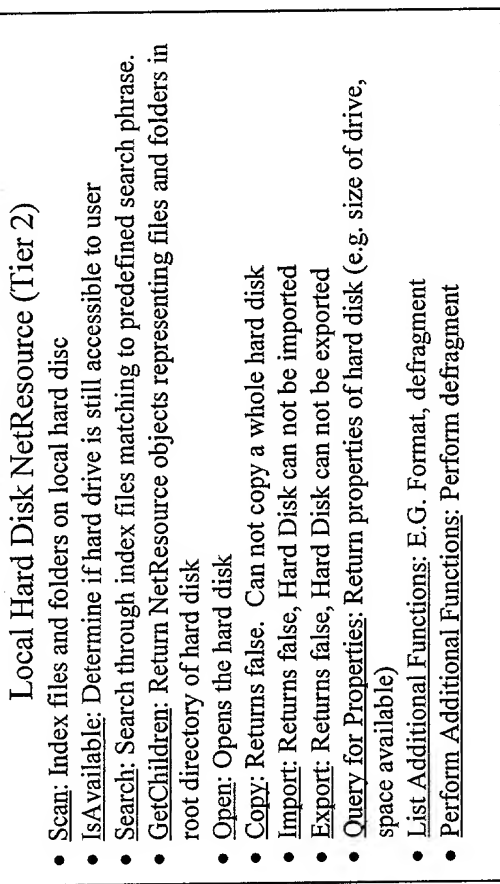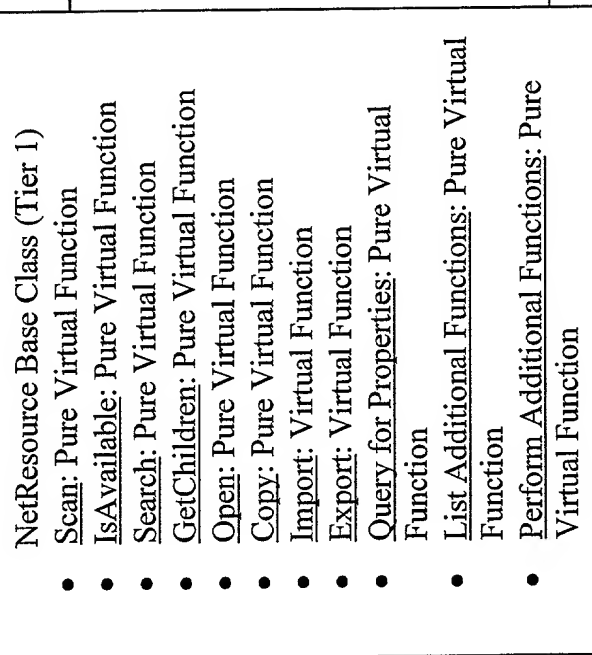- Perform Additional Functions: None to perform

Figure 2

NetResource SubTypes define portions of NetResource API

NetResource Base Class

- Scan: Pure Virtual Function
- IsAvailable: Virtual Function
- Search: Virtual Function
- GetChildren: Virtual Function
- Open: Virtual Function
- Copy: Virtual Function

- Import: Virtual Function
- Export: Virtual Function
- Query for Properties: Virtual Function
- List Additional Functions: Virtual Function
- Perform Additional Functions: Virtual Function

Container NetResource (defined functions listed)

- Scan
- Is Available
- Search
- GetChildren
- Open
- Copy
- Import
- Export
- Query for Properties
- List Additional Functions
- Perform Additional Functions

Virtual NetResource (defined functions listed)

- Scan
- Search
- GetChildren
- Query for Properties
- List Additional Functions
- Perform Additional Functions

Resource NetResource (defined functions listed)

- Open
- Copy
- Import
- Export
- Query for Properties
- List Additional Functions
- Perform Additional Functions

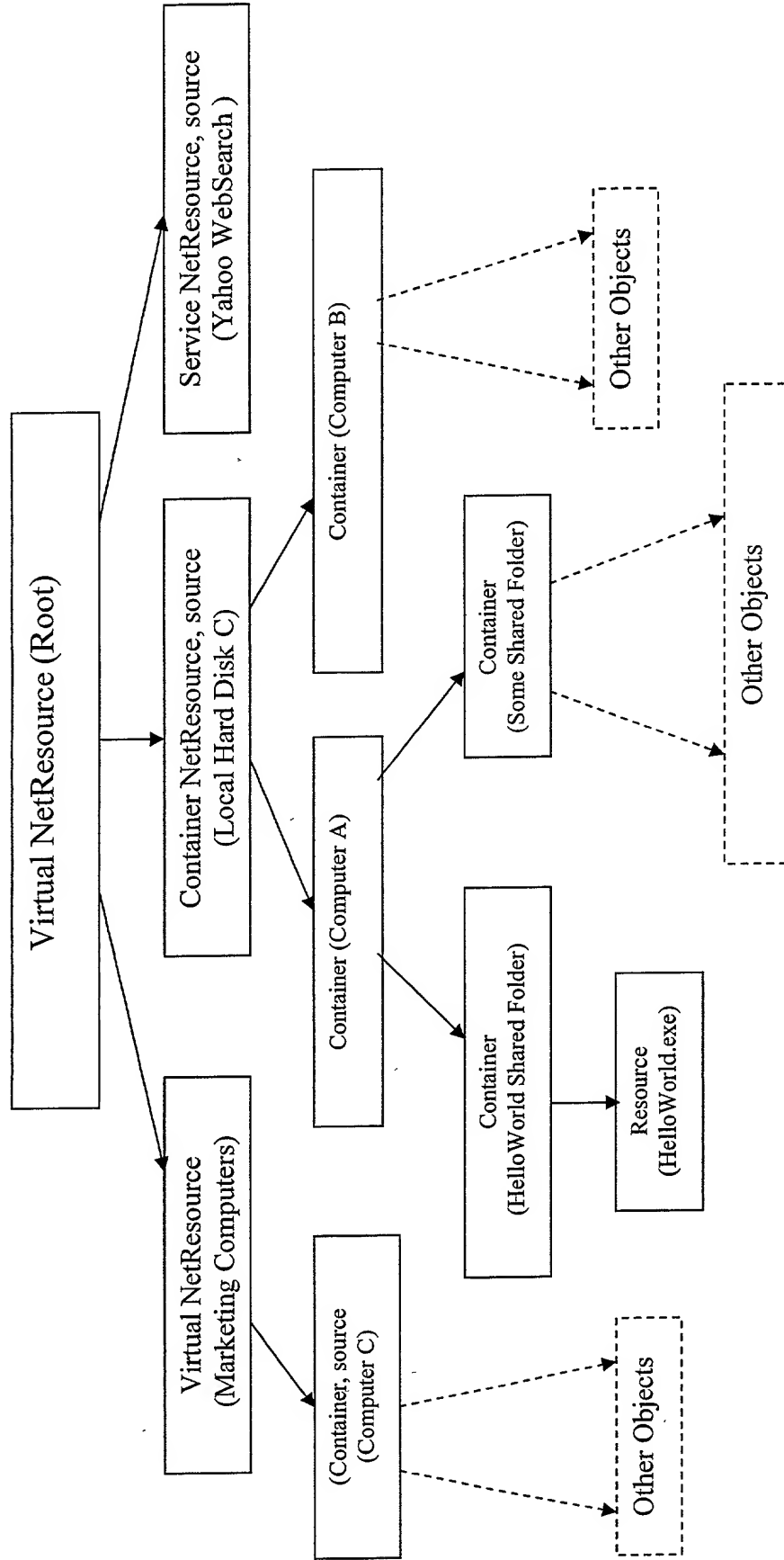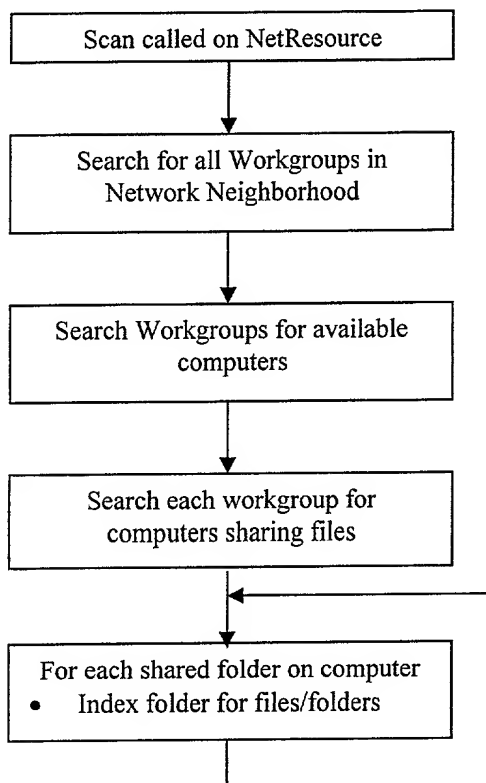**Figure 3**

NetResources organized in a Tree Structure

Figure 4

Scanning Procedures

Network Neighborhood

```
┌─────────────────────────────┐
│  Scan called on NetResource  │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Search for all Workgroups in │
│     Network Neighborhood      │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Search Workgroups for available │
│           computers           │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│    Search each workgroup for  │
│    computers sharing files    │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ For each shared folder on computer │
│ • Index folder for files/folders  │
└─────────────────────────────┘
```

Remote Microsoft Shares Network

```
┌─────────────────────────────┐
│  Scan called on NetResource  │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│  Ping for all computer in IP Range │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ For each available computer, search │
│          for shares.          │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│ For each shared folder on computer │
│ • Index folder for files/folders  │
└─────────────────────────────┘
```

Figure 5

Searching Procedures

Network Neighborhood

Search called on NetResource

↓

Search internally stored listing of files

↓

Return Resource NetResources for matching results

Local Hard Drive

Search called on NetResource

↓

For each directory on the hard drive
- Recursively search subdirectories for matches

↓

Return Resource NetResources for all matching results

WebSearch (e.g. Yahoo)

Search called on NetResource

↓

Send search to remote server

↓

Return Resource NetResources for results from server

Figure 6